

★FAEL- P33 2002-122482/16 ★WO 200202049-A1  
**Mixer especially for a blood bag has two wheels that nip the tube from the bag and squeeze blood from tube to bag and allow flow back into tube and which motion also stirs bag contents (Eng)**

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**Novelty:** The blood bag (3) is held in a holder (5) has a tube (4) connected to the bag that is led between two wheels that nip the tube and when rotated force blood from the tube into the bag and then when rotation is reversed allow it to flow back into the tube. The holder can also impart motion to the bag

**Use:** For mixing the contents of a blood bag before test and use

**Advantage:** The contents of bag and tube may be more thoroughly mixed than by manual methods

**Description of Drawing(s):** Perspective view of the mixer

Bag 3

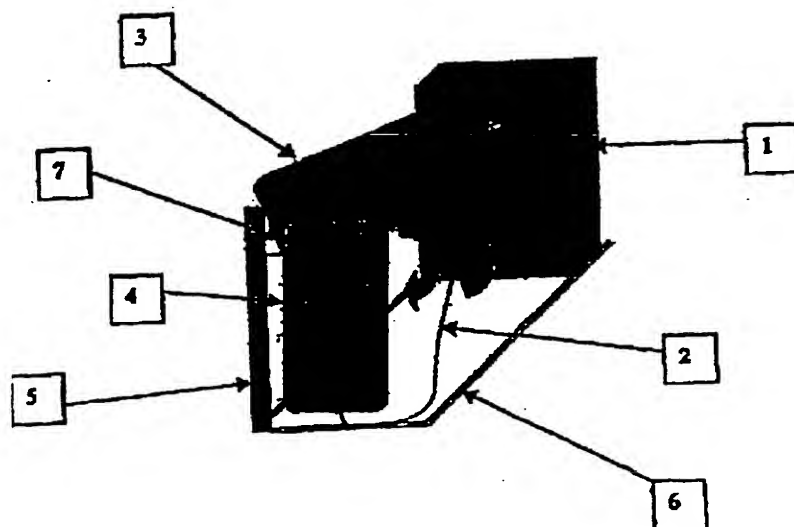
Tube 4

Holder 5

(10pp Dwg.No.1/2)

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*A feeder wheel co-operates with a counter wheel. Both wheels are stationary & tube is fed between them.*



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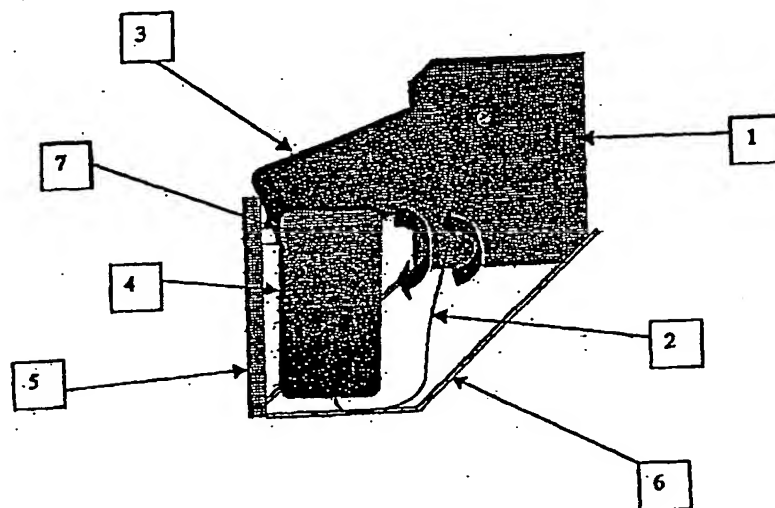
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For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: APPARATUS FOR MIXING A FLUID MEDIUM



(57) Abstract: Blood is stored in a container (3) having a connection tube (2), blood being present in the container (3) as well as in the tube (2). Blood must be tested at prescribed times and the blood in the container (3) and in the tube (2) must then have been thoroughly mixed with each other, which means that the blood in the tube must be introduced into the container (3) and thoroughly mixed with the blood therein and thereafter the mixed blood is introduced into the tube, test samples being taken from the blood in the tube. The blood in the tube (2) has hitherto been conveyed to the container (3) completely manually. By means of the invention, a mechanical apparatus has been created that transports the blood to and from the container (3).



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## APPARATUS FOR MIXING A FLUID MEDIUM

Containers for a fluid medium already exist that have a suspension member at one end and a tube at the other end. When such a container is filled, the tube is also filled. Such units of container and tube can require certain tests of the medium contained and, for the test to be satisfactory, the medium in the tube must be introduced into the container and be very thoroughly mixed there before it can be re-introduced into the tube so that a sample that is suitable for testing can be extracted from the tube. Such a container arrangement is particularly suitable for blood and, for blood to be usable, it must be regularly tested. The blood is commonly contained in bags that have a suspension device at one end and a connection tube at their other end. When it becomes necessary, before a test, the blood contained in the tube is added to the blood contained in the container and is mixed very thoroughly there. When this has been done, the blood has to be re-introduced into the tube. Hitherto, the blood from the tube has been conveyed to the container by a nurse using a pair of roller forceps to press all the blood out of the tube and into the container. This is a strenuous and cumbersome procedure.

The object of the present invention is to relieve a nurse who is preparing for a test of blood by creating an apparatus where the blood in the tube is pressed back into the container, with the aid of the apparatus, and then thoroughly mixed there, whereupon the blood can be re-introduced into the tube. The apparatus in accordance with the invention has a fixing member for the container that is so designed that it can impart different movements to the container. Further, the apparatus has a unit that is capable of compressing the tube so that the blood in the tube is conveyed back to the actual container. Thereafter, the container is subjected to movements so that thorough mixing is obtained. When this is done, the blood is re-introduced into the tube. The evacuation and filling of the tube can be performed a number of times, as required. Customary blood bags are provided with an eyelet at one end and a tube at the other end. When such blood bags are used, the blood bag can be suspended from a stand and the stand thereby constitutes the suspension member. The tube is introduced into a unit that draws the tube towards itself, thereby evacuating its contents into the container, and thereafter moves the tube back so that the same can be filled with blood again. These movements can be repeated. The unit has indicator members that sense both ends of the tube so that the unit is able to evacuate a tube completely.

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Further characteristics of the present invention are disclosed in the claims set out below.

5 An embodiment of the present invention will be described with reference to the two accompanying drawings, in which

Figure 1 show a complete apparatus in accordance with the invention and

Figure 2 shows the unit for evacuating and filling the tube.

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Figure 1 shows a tube-evacuating unit, placed on a shelf, more particularly at one end of said shelf. A holder member, in this case in the shape of a stand 5, is arranged at the other end of the shelf. The apparatus is intended to be utilized for bags of a rectangular shape that are provided with a tube at one end and a suspension eyelet at their other end, this eyelet being attached to an attachment point 7 on the stand. The tube is introduced into an opening in the tube-evacuating unit. The tube-evacuating unit comprises a feeder wheel 8 that co-operates with a counter wheel 9. The tube 2 is introduced into a lower tube passage 11, having tubular character, so that the tube is passed between the envelope surfaces of the two wheels 8 and 9, and thereafter expelled through the upper tube passage. A photocell is provided at each of the two tube passages to sense the ends of the tube. In this way, the blood can be completely evacuated from the tube. The unit 1 has drive arrangements controlled by the photocells 10 and 13 so that movements back and forth are obtained. The unit further has an adjustment device so that the unit can be adapted to different tube diameters.

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The apparatus shown in Figure 1 operates in the following way. A bag 3 is suspended from the attachment point 7 and the tube end is introduced into the opening of the unit 1. Thereafter, the unit is started and it will then draw the tube towards itself until the blood has been evacuated from the lower end of the tube. Drawing the tube of the bag subjects the bag to motion, mixing the quantities of blood from the container and the tube. As the blood bag 3 is suspended from the holder 7, the movements of the tube, caused by the unit 1, will subject the container 3 to vigorous mixing movements. Obviously, an operator can impart additional movement to the container manually so that good mixing is provided. It should be evident, however, that a bag can be placed on a fixing member in one way or another such that the fixing member can impart desired motion to the bag so that

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fully satisfactory mixing takes place and, further, such that the end of the bag tube can be moved towards the tube-evacuating unit 1.

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It should be evident that the present apparatus, which is intended to enable control of superior mixed blood, can also be used for other mediums that require mixing and require control.

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C L A I M S

1. An apparatus for mixing a fluid medium, such as blood, located in a closed container (3 and 4, respectively), such as a rectangular blood bag, which container (3  
5 and 4, respectively) is provided with a tube (2) containing said medium, characterized in that it has a holder member (5) that is constructed in such a way that the container (3 and 4, respectively) with its contents can be subjected to motion of such a kind that the medium is stirred and in that it has a device (1) for bringing the medium in the tube (5) back to the container (3) and  
10 for allowing the medium to flow back into the tube (3).
2. An apparatus as claimed in claim 1, characterized in that the device (1) is constructed in such a way that the tube can be evacuated and filled a number of times.  
15
3. An apparatus as claimed in claim 2, characterized in that the tube (2) is drawn into the device (1) and expelled from the same.
4. An apparatus as claimed in claim 3, characterized in that the  
20 tube (2) is compressed between the envelope surfaces of two wheels (8 and 9), such as a feeder wheel (8) and a counter wheel (9).
5. An apparatus as claimed in any one or several of the preceding claims, characterized in that the device (1) has indicator means (10 and 13)  
25 to sense the ends of the tube and thereby control the movements back and forth of the tube (2).
6. An apparatus as claimed in claim 1, characterized in that the holder member (5) consists of a fixing unit for a container (3) that is carried in such a way and connected to a drive mechanism of such a kind that the unit can impart  
30 different movements to the container (3) as desired.
7. An apparatus as claimed in claim 1 where the container consists of a bag with a tube at one end and a suspension eyelet at the other end, characterized  
35 in that the holder member (5) consists of a stand with a member for co-operating with the eyelet of the bag (3).

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Fig. 1

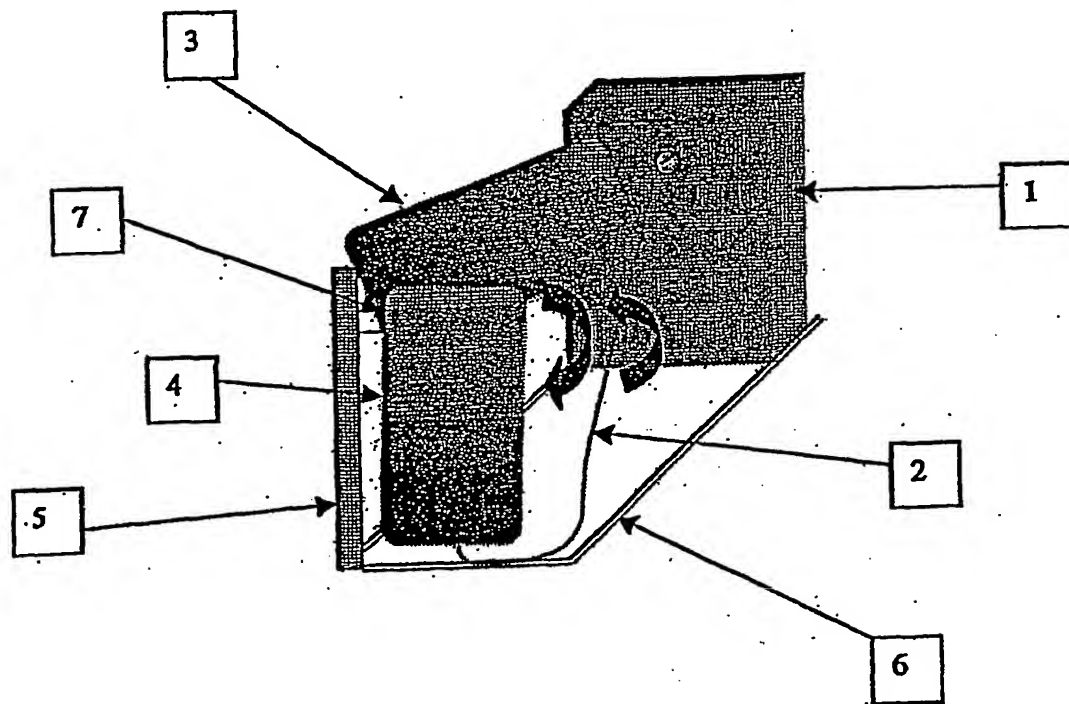
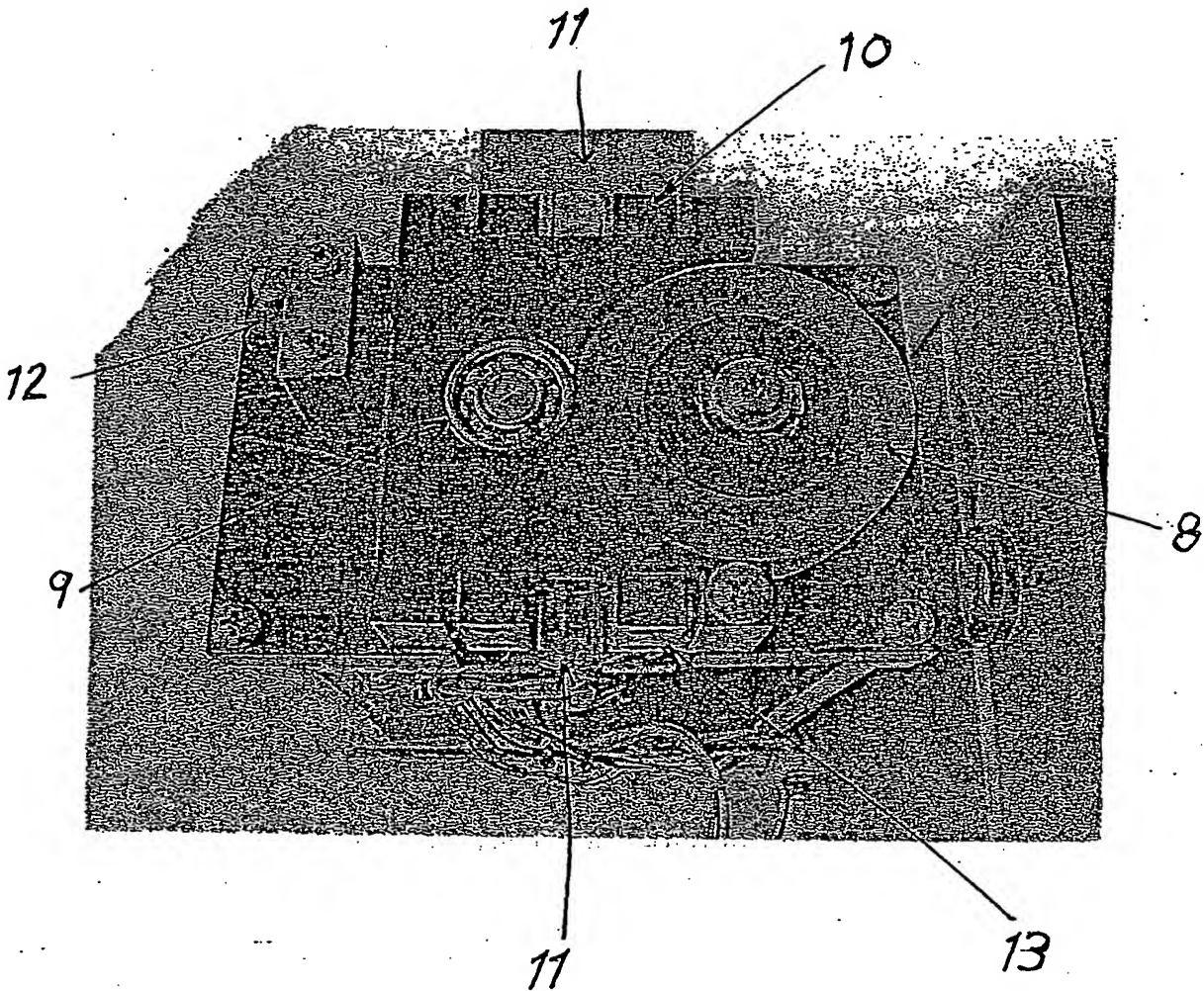


Fig. 2





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/01480

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61J 1/05, A61J 1/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4606734 A (MARK E. LARKIN ET AL), 19 August 1986 (19.08.86), figures 1-5, claims 1-11	1-7
A	US 4610684 A (KENNETH H. KNOX ET AL), 9 Sept 1986 (09.09.86), figures 1-8, claims 1-17	1-7
X	WO 9427715 A1 (MIGADA INC.), 8 December 1994 (08.12.94), figures 1-5, claims 1 and 12	1-4,6-7
X	FR 2785178 A1 (LABORATOIRE AGUETTANT), 5 May 2000 (05.05.00), page 5, line 14 - line 26, figures 4 and 5, claims 1-5	1-4,6-7

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

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Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International application No.  
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**Box I** Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 3-6  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
**Patent claims must be clear and concise in order to enable potential users to ascertain, without undue burden, the scope of protection. Therefore, claims 3-6 do not fulfil the requirements of clarity and conciseness according to PCT Rule 6 and Article 6**
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II** Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

01/10/01

International application No.  
PCT/SE 01/01480

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	4606734	A	19/08/86	NONE	
US	4610684	A	09/09/86	NONE	
WO	9427715	A1	08/12/94	DE 69414573 D,T EP 0702595 A,B IL 105852 A US 5817083 A	27/05/99 27/03/96 12/09/96 06/10/98
FR	2785178	A1	05/05/00	NONE	

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